

Cisco MGX 2 x T3/E3 Frame Service Modules

THE CISCO FRSM-2T3E3 AND FRSM-2CT3 FRAME SERVICE MODULES (FRSMs) ARE DESIGNED FOR USE WITH THE MGX 8230 AND MGX 8250 MULTISERVICE GATEWAYS, THE MGX™ 8800 SERIES WIDE-AREA EDGE SWITCH AND THE BPX® 8680 UNIVERSAL SERVICE NODE. THE FRSM-2T3E3 AND FRSM-2CT3 FRAME SERVICE MODULES OFFER HIGH-SPEED T3/E3 AND HIGH-DENSITY N X DS0/DS1 FRAME SERVICE INTERFACES FOR THE NEW WORLD OF DATA NETWORKING.

Demand for high-density aggregation of branch traffic for global enterprises, high-capacity corporate backbones, high-speed access to the global Internet, and service provider internetworking has led to growth in Frame Relay service offerings, and the demand for higher-capacity frame interfaces.

The FRSM-2T3E3 provides two ports of high-speed T3 or E3 frame services on a single, seven-inch function module, while the FRSM-2CT3 provides two channelized T3 interfaces on a single, seven-inch function module for high-density n x DS0 and DS1 frame services.

The FRSM-2T3E3 provides direct connectivity to two full-duplex T3 or E3 lines. In addition to clear channel support, to support the widest range of operational environments, the FRSM-2T3E3 supports proprietary subrate and scrambling features of the T3/E3 DSU vendors Digital Link and ADC Kentrox. Subrate support in the FRSM-2T3E3 maximizes the application of these products in service provider environments for tiered DS3 services. Using the FRSM-2T3E3, up to 48 T3 or E3 ports can be operated simultaneously on the MGX 8800 wide-area edge switch platform, and up to 768 T3 or E3 ports can be operated simultaneously on the BPX 8680 universal service node.

The FRSM-2CT3 provides direct connectivity to two full-duplex T3 lines. Each T3 line provides channelized operation to support n x DS0 and DS1 service ports. Using the FRSM-2CT3, up to 1344 DS1 ports or channelized DS1s can be operated simultaneously on the MGX 8800 wide-area edge switch platform.

Ordering Information

MGX-FRSM-2T3E3(=)	Two clear-channel/subrate T3 or E3 frame service modules
MGX-FRSM-2CT3(=)	Two channelized T3 frame service modules, providing n x DS0 and DS1 ports
MGX-BNC-2T3(=)	Two T3 75-ohm BNC back cards for FRSM-2T3E3 or FRSM-2CT3
MGX-BNC-2E3(=)	Two E3 75-ohm BNC back cards for FRSM-2T3E3
AX-FS-HS(=)	Optional SW license for support of ForeSight and QoS traffic management



Highlights

FRSM cards support multiple HDLC-derivative frame service interfaces, which can be configured on a per-port basis. These service interfaces include the Frame Relay UNI, Frame Relay NNI, ATM FUNI, and frame forwarding—HDLC transparent, providing “channel extension” support for legacy HDLC-based protocols such as Point-to-Point Protocol (PPP).

Traffic is mapped between these service interfaces and the ATM backplane using standards-compliant adaptation. Consistent with Cisco’s intelligent quality-of-service (QoS) management features, T3/E3 FRSM cards support per-VC queuing on ingress and multiple class-of-service (CoS) queues on egress.

T3/E3 FRSM cards can be Y-cabled to provide 1:1 hot-standby redundancy of the FRSM.

Frame Relay-to-ATM network interworking and Frame Relay-to-ATM service interworking are both supported on a per-PVC basis.

FRSM cards are supported by standards-based management tools, including SNMP, TFTP (for configuration/statistics collection), and a command-line interface. Cisco’s WAN Manager and CiscoView tools also provide full graphical user interface support for connection and equipment management.

With these feature options, customers can independently use either frame- or cell-based interfaces at each site, with independent selection of encapsulation techniques, such as IETF RFC 1490 or 1483, and ensure that the sites communicate.

Features

Physical Layer

T3 Interfaces

- Two DSX-3 (44.736 Mbps +/-20 ppm) interfaces with dual female 75-ohm BNC coaxial connectors per port (separate RX and TX)
- B3ZS line coding
- Pulse shape conforming to ANSI T1.102.1993
- C-bit parity and M13 line framing formats
- Scrambling and subrate (FRSM-2T3E3) support of major DSU vendors
- T3 bit error rate tester (BERT) and extended loopback pattern generation/verification

- 1:1 redundancy with Y-cabling for T3 FRSM cards of the same type
- LOS, OOF, AIS, RAI, FEBE alarm detection/generation support

E3 Interfaces

- Two G.703 (34.368 Mbps +/-20 ppm) interfaces with dual female 75-ohm BNC coaxial connectors per port (separate RX and TX)
- HDB3 line coding
- Pulse shape conforming to ITU G.703
- ITU G.751 line framing format
- Scrambling and subrate (FRSM-2T3E3) support of major DSU vendors
- E3 BERT and extended loopback pattern generation/verification
- 1:1 redundancy with Y-cabling for T3 FRSM cards of the same type
- LOS, OOF, AIS, RAI, FEBE alarm detection/generation support

Data-Link Layer

All Port Types

- 7E flags used to delineate frames (with bit stuffing to prevent false flags) and for interframe gaps
- One flag between frames is considered valid upon receipt
- Supports configuration of one- or two-flag minimum interframe gap for transmission
- Valid frame sizes are 5 to 4510 octets
- Supports up to 2000 (FRSM-2T3E3) or 4000 (FRSM-2CT3) virtual connections per card
- Each logical port on an FRSM independently configurable to run Frame Relay UNI, Frame Relay NNI, ATM FUNI, or frame forwarding

Frame Relay

- Each logical port is independently configurable as Frame Relay UNI or Frame Relay NNI
- Meets ANSI T1.618, using two-octet headers
- Interpreted CCITT-16 CRC at end of the frame (frame discard if in error)
- Supports ITU-T Q.933 Annex A, ANSI T1.617 Annex D, and LMI local management for semipermanent virtual circuits (both UNI and NNI portions); enhanced LMI provides autoconfiguration of traffic-management parameters for attached Cisco routers

- Frame Relay-to-ATM network interworking (FRF.5) and Frame Relay-to-ATM service interworking (FRF.8), both transparent and translation modes, configured on a per-permanent virtual circuit (PVC) basis
- Ability to extend ForeSight® license technology between two Cisco networks across FR-UNI or FR-NNI using ANSI
- T1.618 consolidated link-layer messages (CLLM)
- Standards-based CIR policing and DE tagging/discarding
- Support for high-priority, rt-VBR, nrt-VBR, VBR, and ABR-ForeSight QoS

ATM FUNI

- ATM Forum FUNI mode 1A supported
- Interpreted CCITT-16 CRC at end of the frame (frame discard if in error)
- AAL5 mapping of user payload to ATM
- Supports 16 VPI values (15 plus the zero VPI); supports virtual path connections (VPCs) for all nonzero VPI values (up to 15 VPCs)
- Supports 64 VCI values
- Supports OAM frame/cell flows
- Standards-based usage parameter control
- Support for high priority, rt-VBR, nrt-VBR, VBR, and ABR-ForeSight QoS

Frame Forwarding

- No assumptions made on the frame header format
- Interpreted CCITT-16 CRC at end of the frame (with frame dropping on an error)
- If a connection is set up, all frames are routed to/from that connection; otherwise the frame is discarded
- No translation/mapping attempted between frame header bits and ATM layer EFCI and DE bits

- A single set of Frame Relay traffic access parameters (for example, CIR) is configured for the logical port in frame-forwarding mode; all arriving frames are treated as if they arrived without a set DE bit; if the frame is determined to exceed the committed rate (exceeding CIR), the CLP of all cells associated with that frame is set to indicate low priority; if the frame exceeds the total rate allowed for committed and uncommitted traffic, the frame is discarded
- Support for high priority, rt-VBR, nrt-VBR, VBR, and ABR-ForeSight QoS

General Card Information

Indicators

- Per card: Active (green), standby (yellow), fail (red)
- Per line: Active and OK (green), active and local alarm (red), active and remote alarm (yellow)

Maintenance/Serviceability Features

- Internal problem isolation loopbacks
- Hot-pluggable

Reliability

- > 100,000 hours MTBF

Card Size

- Front cards: 7.25 x 15.83 in.
- Back cards: 7.0 x 4.125 in.

Power

- FRSM-2CT3= -48 VDC, 49.20W
- FRSM-2T3/E3= -48VDC, 45.25W



Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems Europe
11, Rue Camille Desmoulins
92782 Issy Les Moulineaux
Cedex 9
France
<http://www-europe.cisco.com>
Tel: 33 1 58 04 60 00
Fax: 33 1 58 04 61 00

Americas
Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-7660
Fax: 408 527-0883

Asia Headquarters
Nihon Cisco Systems K.K.
Fuji Building, 9th Floor
3-2-3 Marunouchi
Chiyoda-ku, Tokyo 100
Japan
<http://www.cisco.com>
Tel: 81 3 5219 6250
Fax: 81 3 5219 6001

Cisco Systems has more than 200 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the

Cisco Connection Online Web site at <http://www.cisco.com/go/offices>.

Argentina • Australia • Austria • Belgium • Brazil • Canada • Chile • China • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE
Finland • France • Germany • Greece • Hong Kong • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia
Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Singapore
Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela

Copyright © 2000, Cisco Systems, Inc. All rights reserved. Printed in the USA. MGX is a trademark; BPX, Cisco, Cisco IOS, Cisco Systems, the Cisco Systems logo, and ForeSight are registered trademarks of Cisco Systems, Inc. or its affiliates in the U.S. and certain other countries. All other trademarks mentioned in this document are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any of its resellers. (9912R)

03/00 SP